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THE HEALTH OF BOSTON AND PHILADELPHIA.

In articles on Municipal Sanitation in Washington and Baltimore and in New York and Brooklyn, published in THE FORUM for August and November, 1893, attention was called to the great differences between the death-rates of different races, and to the importance of taking these differences into account when trying to ascertain why the death-rate of a particular locality is unusually high or low. In this paper it is proposed to consider the vital statistics of Boston and Philadelphia from the same points of view, that is, using average death-rates derived from the data obtained by the Eleventh United States Census for the six years ending May 31, 1890.

The density of population of each city on June 1, 1890, is shown by the following table:

	Population	Acres	Dwellings	Persons per acre	Persons per dwelling
Boston.....	448,477	23,041	52,669	19.46	8.52
Philadelphia...	1,046,964	82,810	187,052	12.64	5.60

Boston was therefore decidedly the more densely populated, but the comparison of "persons per acre" is not a fair one, owing to the large amount of almost rural district included within the municipal limits of Philadelphia,—as, for example, in Ward 23, which contained 27,081 acres, or a little more than one-third of the total area of the city excluding parks and cemeteries, and had an average population of only 1.30 persons to the acre. A larger proportion of the business population lived outside the city limits in the case of Boston than in that of Philadelphia. The average altitude of Boston is 70 feet, of Philadelphia 129 feet; and in a general way it may be said that the higher the altitude of a ward in either city the lower was its death-rate; but this influence is often dominated by the presence of a greater or less proportion of children, or of persons of Irish descent predisposed to consumption and pneumonia. More than 65 per cent of the population of Boston live at an altitude less

than 30 feet; while in Philadelphia only 23.4 per cent live on this low level.

A large part of the area within the municipal limits of Boston is "made-ground," including what is known as the "Back Bay area," on which are some of the best houses in the city. The material used for filling this particular portion was clean gravel, but in other parts the filled ground contains much rubbish, and probably exerts some injurious effect upon the health of the inhabitants.

During the six-year period the average annual death-rate in Boston, excluding still births, was 23.59, and in Philadelphia 21.86 per 1,000 of mean population. For the census year alone the death rates per 1,000 were, for Boston, 23.44; for Philadelphia, 21.29,—being increased in each city by an epidemic of influenza. Furthermore the death-rate of Boston was higher than that of Philadelphia each year from 1871 to 1890.

As a general rule the larger a city the greater its death-rate, London being the most marked exception; but in the case now before us the smaller city has the higher death-rate. Why is this? That it was not due to the presence of a greater proportion of children and old people (who have high death-rates), is shown by the following table, from which it will be seen that the death-rates in Boston were absolutely higher at these ages than they were in Philadelphia:

	UNDER 5 YEARS OF AGE		65 YEARS AND UPWARD	
	Per 100,000 popu- lation	Death-rate per 1,000	Per 100,000 popu- lation	Death-rate per 1,000
Boston	8,919	87.17	3,813	94.68
Philadelphia	9,919	75.95	3,895	89.01

It has been shown in previous articles¹ that, in cities, the death-rate of the colored inhabitants is higher than that of the whites, and that the death-rate of certain of the white races—as, for example, of Irish adults or Italian children—is much higher than of that of other races, such as English or Germans. We cannot, however, compare Boston and Philadelphia as to details of race mortality in the manner that was done for New York and Brooklyn, because in Philadelphia the birthplace of the father and mother of the decedent is not regis-

¹ See THE FORUM, Vol. XV. pp. 303, 727 (May and August, 1893); Vol. XVI. p. 346 (November, 1893).

tered as it is in Boston and New York. The Philadelphia health authorities register only the birthplace of the person who dies, and this is not at all sufficient to show differences in the mortality of the white races, because all the children born in this country of Irish, German, and other foreign mothers are recorded as native Americans. In Boston the death-rate of the whites whose mothers were born in the United States was 21.30; in Philadelphia the death-rate of the whites born in the United States was 25.17,—the higher rate in the latter city being due simply to the much larger proportion of children contained in the group under consideration.

The proportion of colored population in Philadelphia was 38.5 per 1,000, or twice as great as in Boston, where it was 19.1, and the death-rate of the colored was, as usual, higher than that of the whites in each city, being 31.25 in Philadelphia, and 31.92 in Boston: hence the higher average death-rate in Boston was not due to its colored population. The proportion of foreign-born inhabitants in the population of Boston, June 1, 1890, was 349 per 1,000, while in Philadelphia it was 256, and this difference was no doubt in part the cause of the difference in death-rates of the two cities. Of the population of Boston, 160,733, or 35.8 per cent, were Irish, and 45,450 were Canadians. In Boston the death-rate of those whose mothers were born in Ireland was 27.27; of those whose mothers were born in Canada, 20.37; of those whose mothers were born in Germany, 17.17. If we take only those fifteen years of age and upward, the death-rates for Boston and Philadelphia are as follows:

	Irish	Scotch	American	English	German	French	Canadian	Hungarian	Bohemian	Scandinavian	Italian
Boston.....	24.12	14.95	14.79	13.62	13.52	12.91	10.73	10.42	9.49	8.88	8.29
Philadelphia.....	19.43	9.30	17.57	10.65	14.70	9.61	6.82	2.42	2.07	4.08	8.93

These rates for the two cities are not directly comparable, for reasons given above; but they indicate the powerful influence of race on mortality in each city.

Regarding the death-rates in different parts of these cities, the variation in Boston was from 33.14 in Ward 8, to 15.06 in Ward 11; and in Philadelphia, from 33.87 in Ward 4, to 16.45 in Ward 28. The causes of these great differences cannot be here discussed; they are partially indicated in a special report of the United States Census

Office, soon to be published; but the following comparisons may serve as a partial illustration:

Boston	Population	Persons per acre	Under 15 years, per cent	Irish	Canadians	DEATH-RATE PER 1,000				
						Under 5 years	Irish, 15 years and over	Consumption	Pneumonia	Diphtheria
Ward 8 (a) .	13,026	180.9	24.5	5,304	1,020	129.9	34.7	6.7	3.0	2.0
Ward 11 (b) .	21,660	51.0	12.5	4,610	2,208	82.8	13.58	1.9	1.3	.06

(a) A low-lying water-side district, in an old part of the city, largely filled ground.

(b) A low-lying water-side district, originally a marsh, occupied mainly by a well-to-do class.

The conditions which mainly produced the marked difference in mortality in the two wards appear to have been the density of population, the proportion of children and of persons of Irish descent in the population, and relative poverty; while water-supply, subsoil water-levels, and sewerage had nothing to do with it, and the sanitary condition of the streets very little.

Philadelphia	Population	Persons per acre	Under 15 Years, per cent	Colored	Foreign-born whites	DEATH-RATE PER 1,000				
						UNDER 5 YEARS	White	Colored	Consumption	Pneumonia
Ward 4 (c) . .	20,384	140.6	31.4	2,592	8,752	99.3	215.3	4.4	3.0	1.6
Ward 28 (d) . .	46,390	14.6	31.4	663	11,055	52.5	90.6	1.9	1.3	0.8

(c) A low-lying district, one of the oldest sections of the city, containing many small streets, courts, and alleys, and a poor and unclean class of people.

(d) Situated at an average altitude of 119 feet; the buildings are neat and well-arranged; the residents are chiefly merchants, clerks, and well-to-do mechanics.

The conditions producing the heavier death-rate in Ward 4 were density and character of population, poverty, and uncleanliness; the typhoid-fever death-rate was below the city average in both wards; and the water-supply had nothing to do with the difference in the gross death-rates. The sewerage and house-drainage were in better condition in Ward 28 than in Ward 4, but it is not probable that this had any effect on the consumption and pneumonia death-rates.

Let us now consider briefly some of the causes of death in the two cities, as shown in the following table:

	PER 10,000 OF POPULATION			PER 100,000 OF POPULATION			
	Consumption	Pneumonia	Typhoid fever	Alcoholism	Child-birth and puerperal fever (a)	Accidents and injuries	Suicide
Boston.....	38.7	22.	3.9	18.	46.59	97	11
Ward 8.....	67.2						
Philadelphia.....	29.8	16.4	6.9	9.26	24.58	80	9

(a) Women between 15 and 45 years of age.

Climatic conditions no doubt had something to do with the differences as regards consumption and pneumonia; but the greater proportion of persons of Irish descent in Boston was also a cause, and the proportion of infected houses was probably greater in Boston than in Philadelphia. The low proportion of tenement-houses in Philadelphia, and the fact that in that city each family as a rule occupies a separate dwelling, has a powerful influence in reducing its mortality. The figures for typhoid fever indicate a more polluted water-supply for Philadelphia than for Boston. Diphtheria, measles, whooping-cough, cancer, and heart-disease were more fatal in Boston, but the differences in death-rates due to these diseases are insignificant in comparison with those due to consumption and pneumonia. The returns for alcoholism are much below the true rates, yet it is quite probable that alcoholism is nearly twice as fatal in Boston as in Philadelphia in proportion to population. The difference in the fatalities of childbirth and puerperal fever in Boston is probably due to the character of the population, and to the fact that a larger proportion of cases of labor are there attended by midwives than is the case in Philadelphia. The difference in the suicide-rate is due to a greater proportion of adult foreigners in Boston, and a greater proportion of colored people in Philadelphia, the suicide-rate among the latter class being always lower than it is among the whites.

A study of these and other statistics relating to the causes of death in the two cities leads to the conclusion that the persistently higher death-rate in Boston as compared with that of Philadelphia for the last twenty years has been due mainly to diseases of the lungs, and more especially to consumption and pneumonia, and that this excessive fatality from these diseases is due, to a considerable extent, to the race-characteristics and density of the population.

The density of population affects the death-rates from diseases of this kind, partly because it increases the liability to contract diseases from infected houses, but mainly through the poverty, ignorance, uncleanliness, and alcoholic habits which characterize the majority of the tenement-house class. It has been shown in the paper on New York and Brooklyn¹ that all of these conditions together may be dominated by race characteristics, and that some of the most crowded districts in New York, inhabited by a poor and unclean class of people, have low death-rates because these people are of the Jewish race; but the number of this class is not sufficient in any ward in either Boston or Philadelphia to produce such a lowering of the death-rate in that ward as to be especially noticeable. The differences between the two cities as to climatic conditions no doubt produce some differences in the death-rates; but these differences in the aggregate are not large, for the extra mortality in the winter months in Boston, due to diseases of the respiratory organs, is to some extent counterbalanced by an extra mortality in Philadelphia during the summer months, due to diarrhoeal diseases in children, and by the greater liability to malarial disease in the latter city.

In Boston the lowest death-rate was in June; in Philadelphia in September; in both cities the highest death-rate was in July, owing to the mortality among children under five years of age, which in Boston was 104.08, and in Philadelphia 132.02.

The longer and colder winters in Boston increase the death-rate mainly by causing the poorer classes to huddle in ill-ventilated rooms for the sake of warmth; the higher and more continuous summer temperatures in Philadelphia increase the death-rate of little children mainly by promoting the growth of certain forms of bacteria whose products are especially irritating to the intestinal canal, but also by the direct action of the heat upon the nervous system.

The average daily consumption of water per head was, for Boston about 89 gallons, for Philadelphia 111 gallons,—the Boston supply being the freest from excremental pollution. The number of saloons to each 1,000 persons was, in Boston 1.33, in Philadelphia 1.15. The sewer system of Boston was in better condition than that of Philadelphia, but there were a number of privy-vaults and cesspools in Boston also, and during the year 1890 about 1,300 of these were reported as having been cleansed and repaired, and 784 as having been abolished. In Philadelphia over 3,500 privy-wells were reported as more or less of a nuisance during the year 1890.

¹ THE FORUM, Vol. XVI. p. 348 (November, 1893).

In Boston the Board of Health is a separate department, reporting directly to the mayor; in Philadelphia it is one of the bureaus subordinate to the Department of Public Safety. The Boston Board, in 1890, expended \$52,643.14 in its work, exclusive of \$15,890 on public baths, and \$16,514.43 on quarantine. The Philadelphia Board spent about \$90,000 in its work, besides about \$20,000 on quarantine. The items are not fully comparable, but Boston expends considerably more than Philadelphia upon its sanitary work in proportion to its population. This should be the case, in view of the number of its tenement-house class, but neither Board has a sufficient number of inspectors to do the work required of it.

Taking into consideration the fact that the annual tax levy for all purposes in Boston is over \$11,000,000, and in Philadelphia over \$13,000,000, it would seem that \$100,000 for Boston and \$150,000 for Philadelphia would be a judicious minimum annual expenditure upon the Health Department. Heretofore Boston has expended more than Philadelphia upon sanitary engineering works, and this appears in the indebtedness per capita—which is for Boston \$62.82 and for Philadelphia \$28.29. Recently, however, Philadelphia has expended several millions of dollars upon street and other improvements which were badly needed, and many of which will have a good influence upon the public health.

Boston has an excellent hospital for cases of such diseases as diphtheria and scarlet fever, giving the Health Department facilities for their isolation. Philadelphia is not thus provided, although it has a good smallpox hospital. The summer public bath-houses in both cities are much used in warm weather, and are important sanitary institutions, but there are no public wash- and bath-houses for use during the winter months. Each city has a quarantine establishment that is fairly well equipped, and will probably be sufficient to meet the demands made upon it. The Philadelphia quarantine is now secondary to the United States quarantine lower down the Delaware, which is a good arrangement, especially as regards protection from yellow fever. Although the death-rate of Philadelphia is below that of Boston, it is probable that by the aid of sanitary engineering more can be done toward lowering the death-rate of the former city than can be done for the latter.

Philadelphia has the immense sanitary advantage of having the great majority of its families supplied each with a separate house; and if it can obtain a fairly pure water-supply, and a properly planned

and well-constituted system of sewerage, it should be possible to maintain its death-rate for a series of years at about 18 per 1,000, while it is not probable that the death-rate of Boston can be brought, by such means, below 21 per 1,000 for more than a year or two at a time. The causes of disease and death which the health authorities of Boston can probably attack with the most hope of good results are consumption and pneumonia, and this is to be done largely by educating the class most affected by these diseases as to the comparatively simple measures required to check their spread, and by aiding in the thorough disinfection of houses, rooms, clothing, and bedding infected by their germs. Something may also be done in the same direction in certain districts in Philadelphia. Many people now understand more or less clearly the utility of limiting the spread of the bacillus of tubercle, and the means of doing it; but it is not generally known that the micrococcus of pneumonia also infects certain overcrowded and ill-kept rooms, and that its spread may be limited by measures analogous to those used for tuberculosis.

Diphtheria is another disease which may be greatly lessened in each of these cities by proper precautions and treatment; but to effect much in this direction the means at the command of the Boards of Health must be considerably increased, to enable them to make a prompt and accurate diagnosis in doubtful cases, and to secure isolation and proper care in those cases which will receive such care in their own houses. Philadelphia should add to its form of death registration the item of birthplace of parents of the decedent, and should by all possible means maintain its present relative exemption from tenement-houses. It can, more easily than any other large city in this country, enforce stringent regulations upon tenement-house owners and lodgers to secure light, ventilation, abundant water-supply, satisfactory drainage, and cleanliness in such houses, and if by doing this it makes the owning and renting of foul rookeries unprofitable, and drives from the city the class of people whose habits and needs make it profitable, it will be pursuing a wise policy.

The man who lives in his own house in Boston has as long an expectation of life for himself and his family as the man under similar circumstances in Philadelphia, since the specially unfavorable sanitary conditions in the former city affect chiefly the tenement-house population, and can only be improved by municipal action tending to scatter and disperse that population, which action probably cannot now be taken in that city.

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